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International Classification:—B05. B43b, c.

COMPLETE SPECIFICATION.

Improvements in or relating to Dispensing Devices.

I, ROBERT AMOS, a Subject of the Queen of Great Britain, of 143 Cannon Street, London, E.C.4, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with improvements in or relating to devices for dispensing liquid or semi-liquid, e.g. pasty, materials and is concerned more particularly to provide such a device which is adapted to be carried in a pocket and used by a person for the application of the material to a surface much in the same manner that a writing instrument employing an ink is used.

It is an object of the invention to provide such a device which is adapted particularly, although not exclusively, to dispense and apply to a surface a liquid or semi-liquid adhesive.

It has already been proposed to provide a dispenser for a liquid or semi-liquid adhesive which comprises a reservoir having a circular outlet at one end of (or in the end of a dispensing tip mounted on) the reservoir, a ball being seated against said circular outlet within the reservoir and partly protruding through the outlet, the ball being resiliently urged into co-operation into the outlet to seal the same when the dispenser is not in use and being adapted when pressed on a surface to which the adhesive is to be applied to be urged against the spring bias away from the outlet so that the adhesive liquid may gain access to the exterior.

When the dispensing tip is lifted from the surface the ball again seats in the outlet at least partially to close the same, and a film of the dispensed adhesive forms over the outlet and the protruding portion of the ball to seal the same against the entry of air into the reservoir.

According to the present invention I provide a device for dispensing a liquid or semi-liquid material compriaing a reservoir having an outlet, a stem extending through the outlet from the interior of the reservoir, an applicator mounted on the stem externally of the reservoir and adapted to close the outlet at least partially when the device is not in use and to be moved away from the outlet to leave a gap therebetween for the egress of the material when the applicator is pressed on a surface which makes an acute angle with the stem and means associated with the stem and arranged resiliently to oppose movement of the applicator away from the outlet.

It will be appreciated that my construction differs from prior proposals primarily in that the applicator, for example a ball, is disposed externally rather than internally of the outlet. A particular advantage of such a construction is that as the device is used for applying liquid or semi-liquid materials, for example an adhesive, to a surface, the stem supporting the applicator is moved first in one direction and then in another against the periphery of the outlet and acts to keep the outlet clear and break away any small portions of dried adhesive that may tend to block the same.

In order that the present invention may be more readily understood two examples will now be described with reference to the accompanying drawing, in which:—

Fig. 1 shows one type of dispenser according to the invention in longitudinal section;

Fig. 2 is a fragmentary view of the operative end portion of the dispenser, shown in Fig. 1, in the process of being applied to a sheet of paper or the like, the applicator being in the operative position;

Fig. 3 is a similar view but with the applicator displaced into the operative position by contact with the sheet;

Fig. 4 is a plan view of a washer incor-

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portsed in the dispenser illustrated in Figs. 1, 2 and 3;

Fig. 5 is a view similar to that of Fig. 2 but showing a different form of applicator which is in the inoperative position;

Fig. 6 is a plan view of Fig. 5 with the applicator removed;

Fig. 7 is a section taken on the line VII-VII of Fig. 5; and

Fig. 8 is a fragmentary view of the tip portion of the dispenser of Figs. 5 to 7 with the applicator displaced to its operative position.

Referring to Figs. 1 to 4, one construction of adhesive dispenser according to my invention includes an elongated reservoir 1 for the adhesive, open at one end 2, and having a dispensing cap 3 secured, for example by screwing, on the open end. The dispensing cap has a circular orifice 4 at the extremity and a ball 5 of a rather larger diameter is disposed outwardly of the orifice and sealed against the same. The ball has an elongated stem 6 extending through the orifice 4 into the interior of the cap 3 and through a washer 7 secured within the cap, the stem being formed with a terminal abutment or head 8 at the end thereof distant from the ball. A helical spring 9 is disposed around the stem between the abutment and the washer so as to urge the abutment away from the washer and urge the ball into co-operation with the orifice at least partially to seal the same. The washer (see Fig. 4) may comprise a ring of metal or other material seated on a shoulder 10 of the outlet cap 3, and held between the shoulder and the edges of the outlet end 2 of the reservoir 1 when the latter is screwed into the outlet cap. Arms 11 extend toward the middle of the ring from diametrically opposed points thereof, and a further and smaller ring 12 is supported by the arms so that the stem may extend freely therethrough with some lateral play.

In use, when the dispenser is held in the hand and the ball applied to a surface 13 to which the adhesive fluid is to be applied, it will be appreciated that the gentle pressure used will tend to urge the ball 5 against its spring bias away from co-operation with the orifice 4 in a direction having two components, one axially of the stem 6, and the other normal thereto, so as to leave a gap between the ball and the orifice for the egress of adhesive and for the entry of air to maintain the pressure inside the reservoir at the same value as that outside.

The device may be used either for making one or a series of dots of adhesive on a surface, or for forming a line of adhesive. In the latter case, the ball tip is placed on the surface and gentle pressure applied so that the ball leaves its seating on the outlet. The device is then drawn along the surface whilst the ball is in contact therewith so that the ball will move over the applied adhesive immediately after it is dispensed and will act as an applicator for the fluid to spread the same somewhat. The action of drawing the ball along the surface also aids in drawing the ball clear of the outlet orifice so that a maintained flow of adhesive is obtained, by capillary action or otherwise. As soon as the ball is lifted from the surface it will return to its normal position, sealing the outlet at least partially, and if any small gaps are still left between the ball and the orifice, they will be sealed by a film of adhesive which is readily broken or rubbed away when the device is again required for use.

Usually the device will be symmetrical about its longitudinal axis and it will, therefore, be appreciated that in each successive use the ball and therefore the stem on which it is mounted, will be urged in different directions away from the longitudinal axis of the instrument. At various times, therefore, the stem will be urged against different parts of the periphery of the orifice and will serve to keep the same clean and clear from accumulated and dried adhesive.

A rubber or rubber-like latex adhesive is well suited for use in a dispenser according to the invention and I have found that a particularly suitable adhesive is a pressure-sensitive stabilized resin emulsion adhesive, although unlike the prior dispensers referred to above, an air drying glue as opposed to a pressure-sensitive adhesive, may also be used in view of the cleaning action referred to above, and the ready accessibility of the ball for manual cleaning.

In another embodiment, illustrated in Figs. 5 to 8, the ball of the preceding example is replaced by an applicator having the form of a pair of rollers. In this case the single orifice for the outlet of the adhesive shown in Fig. 1 is replaced by three slits 14 centrally of a semi-cylindrical recessed part 15 at the end of the dispensing tip 16. A spindle 17 is formed on the outer end of the stem 18 and extends normal thereto. A pair of rollers 19 are mounted on the spindle one on each side of the stem and whilst freely rotatable about the spindle are held thereon by abutments 20 formed at each end of the spindle. The two rollers seat in the semi-cylindrical recess 16 of the dispensing tip referred to above, and each is formed with circumferential grooves 21. The stem 18 corresponds to the stem 6 of Fig. 1 and is provided with an abutment 8, spring 9 and washer 7 as before.

The operation of the device is similar to that of the device with a ball applicator. When the rollers are applied to a surface they move against the spring bias away from their seat in the recess to a certain extent and as adhesive is dispensed, the instrument may be drawn over the surface to spread the

adhesive dispensed to form a more-or-less wide band of adhesive on the surface. As the rollers rotate they tend to clean any dried adhesive on themselves or in the recess, and this action is aided by the grooving of the rollers referred to above.

Whilst the embodiments described above have a helical spring surrounding the stem to urge the applicator into co-operation with the outlet orifice when the dispenser is not in use, it is to be understood that means other than a helical spring may be employed instead. Thus the washer 7 may be made of a resilient material, for example nylon, and the stem made of a length corresponding to the axial distance between the washer and the applicator, the inner end of the stem being secured to the washer. When not in use the applicator will thus be held at rest seating on the outlet orifice, and on use the washer will give slightly due to its resilience to permit of the applicator moving away from the orifice to a small extent, sufficient for the adhesive to gain egress to the exterior.

Again, the stem, instead of the washer, may be made of a resilient material, for example nylon. It may be formed with, say, two or three feet at the inner end which tend to splay out at right angles to the axis of the stem but which, owing to their resilience, may be turned in to lie along the axis of the stem for insertion through the outlet orifice and the washer whereupon they splay again to hold the applicator and stem in position whilst having sufficient resilience to allow of the displacement of the applicator during use. It is possible to dispense with a washer member in this construction by arranging that the ends of the splayed legs themselves lodge against the shoulder and are held there in the same way as described for the washer in connection with the first embodiment.

Whilst my dispenser has been described with particular reference to its use in the application of adhesives to surfaces, it will be appreciated that its usefulness is by no means limited to such purpose, and neither is the invention to be regarded as so limited as it may be used for other liquid or semi-liquid materials, e.g. inks, and even for dispensing freely flowing powders which flow in a manner similar to liquid or semi-liquid materials.

What I claim is :—

1. A device for dispensing a liquid or semi-liquid material comprising a reservoir having an outlet, a stem extending through the outlet from the interior of the reservoir, an applicator mounted on the stem externally of the reservoir and adapted to close the outlet at least partially when the device is not in use and to be moved away from the outlet to leave a gap therebetween for the egress of the material when the applicator is pressed on a surface which makes an acute angle with the stem and means associated with the stem and arranged resiliently to oppose movement of the applicator away from the outlet.

2. A device according to Claim 1, wherein the applicator is a ball.

3. A device according to Claim 1, wherein the applicator comprises a roller.

4. A device substantially as herein described with reference to Figs. 1 to 4 or Figs. 5 to 8.

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PROVISIONAL SPECIFICATION.

Improvements in or relating to Dispensing Devices.

I, ROBERT AMON, a Subject of the Queen of Great Britain, of 143 Cannon Street, London, E.C.4, do hereby declare this invention to be described in the following statement :—

This invention is concerned with improvements in or relating to fluid dispensing devices and is concerned more particularly to provide such a device which is adapted to be carried in a pocket and used by a person for the application of a fluid to a surface much in the same manner that a writing instrument employing an ink is used.

It is an object of the invention to provide such a device which is adapted particularly, although not exclusively, to dispense and apply to a surface a fluid adhesive.

It has already been proposed to provide a dispenser for a fluid adhesive which comprises a reservoir having a circular outlet at one end of (or in the end of a dispensing tip mounted on) the reservoir, a ball being seated against said circular outlet within the reservoir and partly protruding through the outlet, the ball being resiliently urged into co-operation into the outlet to seal the same when the dispenser is not in use and being adapted when pressed on a surface to which the adhesive is to be applied to be urged against the spring bias away from the outlet so that the adhesive fluid may gain access to the exterior.

When the dispensing tip is lifted from the surface the ball again seats in the outlet at

least partially to close the same, and a film of the dispensed adhesive forms over the outlet and the protruding portion of the ball to seal the same against the entry of air into the reservoir.

According to the present invention, I provide a fluid dispensing device having an outlet at one end, and an applicator for the fluid disposed externally of the outlet and mounted on a stem extending through said outlet, the said applicator being resiliantly biassed into co-operation with said outlet to close the same at least partially when the device is not in use and adapted to be moved away from said outlet to leave a gap therebetween for the egress of fluid when the applicator is pressed on a surface at an acute angle to the stem.

It will be appreciated that my construction differs from prior proposals primarily in that the applicator, for example a ball, is disposed externally rather than internally of the outlet. A particular advantage of such a construction is that as the device is used for applying fluids, for example an adhesive, to a surface, the stem supporting the applicator is moved first in one direction and then in another against the periphery of the outlet and acts to keep the outlet clear and break away any small portions of dried adhesive that may tend to block the same.

In one construction of adhesive dispenser according to my invention, an elongated reservoir for the adhesive open at one end has a dispensing cap secured, for example by screwing, on the open end. The dispensing cap has a circular orifice at the extremity and a ball of a rather larger diameter is disposed outwardly of the orifice and seated against the same. The ball has an elongated stem extending through the orifice into the interior of the cap and through a washer secured within the cap, the stem being formed with a terminal abutment or head at the end thereof distant from the ball. A helical spring is disposed around the stem between the abutment and the washer so as to tend to urge the abutment away from the washer and, therefore, urge the ball into co-operation with the outlet at least partially to seal the same. The washer may comprise a ring of metal or other material seated on a shoulder within the outlet cap, and held between the shoulder and the edges of the outlet end of the reservoir when the same is screwed into the outlet cap. Arms extend toward the middle of the ring from diametrically opposed points thereof, and a further and smaller ring is subtended by the arms so that the stem may extend therethrough and be free to reciprocate axially therethrough and also free to move slightly therein in a transverse sense.

In use, when the dispenser is held in the hand and the ball applied to a surface to which the adhesive fluid is to be applied, it will be appreciated that the gentle pressure used will tend to urge the ball against its spring bias away from co-operation with the outlet in a direction composed of two components, one axially of the stem, and the other normal thereto so as to leave a gap between the ball and the orifice for the egress of adhesive, and the entry of air to maintain the pressure inside the reservoir at the same value as that outside.

The device may be used either for making one or a series of dots of adhesive on a surface, or for forming a line of adhesive. In the latter case, the ball tip is placed on the surface and gentle pressure applied so that the ball leaves its seating on the outlet. The device is then drawn along the surface whilst the ball is in contact therewith so that the ball will move over the applied adhesive immediately after it is dispensed and will act as an applicator for the fluid to spread the same somewhat. The action of drawing the ball along the surface also aids in drawing the ball clear of the outlet orifice so that a maintained flow of adhesive is obtained, by capillary action or otherwise. As soon as the ball is lifted from the surface it will return to its normal position sealing the outlet at least partially and if any small gaps are still left between the ball and the orifice, they will be sealed by a film of adhesive which is readily broken or rubbed away when the device is again required for use.

Usually the device will be symmetrical about its longitudinal axis and it will, therefore, be appreciated that in each successive use the ball, and therefore the stem on which it is mounted, will be urged in different directions away from the longitudinal axis of the instrument. At various times, therefore, the stem will be urged against different parts of the periphery of the orifice and will serve to keep the same clean and clear from accumulated and dried adhesive.

A rubber or rubber-like latex adhesive is well suited for use in a dispenser according to the invention and I have found that a particularly suitable adhesive is a pressure-sensitive stabilized resin emulsion adhesive, although unlike the prior dispensers referred to above, an air drying glue as opposed to a pressure-sensitive adhesive, may also be used in view of the cleaning action referred to above, and the ready accessibility of the ball for manual cleaning.

In another embodiment of the invention, the ball acting both as a valve and as an applicator may be replaced by a number, in this case a pair, of rollers. In this case the orifice is comprised of one or a number of slits centrally of a semi-cylindrical recessed part at the end of the dispensing tip. A spindle is formed on the outer end of the stem

and extends normal thereto. A pair of rollers are mounted on the spindle one on each side of the stem and whilst freely rotatable about the spindle are held thereon by abutments formed at each end of the spindle. The two rollers seat in the semi-cylindrical recess of the dispensing tip referred to above, and each is formed with circumferential grooves.

The operation of the device is similar to that with a ball applicator. When the rollers are applied to a surface they move against the spring bias away from their seat in the recess to a certain extent and as adhesive is dispensed, the instrument may be drawn over the surface to spread the adhesive dispensed to form a more-or-less wide band of adhesive on the surface. As the rollers rotate they tend to clean away any dried adhesive on themselves or in the recess, and this action is aided by the grooving of the rollers referred to above.

Whilst the embodiments described above have a helical spring surrounding the stem to urge the applicator into co-operation with the outlet orifice when the dispenser is not in use, it is to be understood that means other than a helical spring may be employed instead. Thus the washer may be made of a resilient material, for example nylon, and the stem made of a length corresponding to the axial distance between the washer and the applicator, the inner end of the stem being secured to the washer. When not in use the applicator will thus be held at rest seating on the outlet orifice, and on use the washer will give slightly due to its resilience to permit of the applicator moving away from the orifice to a small extent, sufficient for the adhesive to gain egress to the exterior.

Again, the stem instead of the washer may be made of a resilient material, for example nylon. It may be formed with, say, two or three feet at the inner end which tend to splay out at right angles to the axis of the stem but which, owing to their resilience, may be turned in to lie along the axis of the stem for insertion through the outlet orifice and the washer whereupon they splay again to hold the applicator and stem in position whilst having sufficient resilience to allow of the displacement of the applicator during use. It may be possible to dispense with a washer member in this construction by arranging that the ends of the splayed legs themselves lodge against the shoulder and are held there in the same way as described for the washer in connection with the first embodiment.

Whilst my dispenser has been described with particular reference to its use in the application of adhesives to surfaces, it will be appreciated that its usefulness is by no means limited to such purpose, and neither is the invention to be regarded as so limited as it may be used for other fluids, e.g. inks, and even for dispensing freely flowing powders.

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795,304 COMPLETE SPECIFICATION
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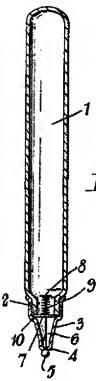

FIG. 1.

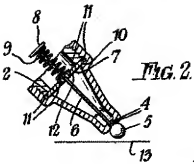

FIG. 2.

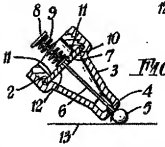

FIG. 3.

FIG. 4.

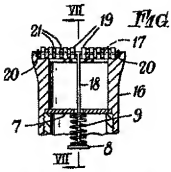

FIG. 5.

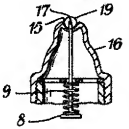

FIG. 7.

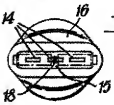

FIG. 6

FIG. 8.